

AMENDED CLAIMS

[received by the International Bureau on 23 May 2005 (23.05.05);
original claims 1-11 replaced by amended claims 1-11 (3 pages)]

1. A decoder for a wireless communication device comprising a calculator for calculating the modulo of a linear approximation of a MAX* function; and a selector for selecting a MAX* output value from the group $a(n) \bmod F$, $b(n) \bmod F$, and the calculated modulo based upon a determination as to whether a predetermined threshold value for $|a(n) - b(n)|$ has been met, where $a(n)$ is a first state metric, $b(n)$ is a second state metric, C is the predetermined threshold value and F is a value greater than $|a(n) - b(n)|$ whereby to enable the calculator to calculate the modulo of the linear approximation of the MAX* function using a $\bmod F$ function of $a(n) \bmod F$, $b(n) \bmod F$ and C .

2. A decoder according to claim 1, wherein the calculator is arranged to calculate the modulo of the linear approximation of the MAX* function using:

$$\left(a(n) \bmod F + \frac{((b(n) \bmod F - a(n) \bmod F) \bmod F + C)}{2} \right) \bmod F.$$

3. A decoder according to claim 1, wherein the calculator is arranged to calculate the modulo of the linear approximation of the MAX* function using:

$$\left(\left(\frac{(a(n) \bmod F + C) \bmod F + b(n) \bmod F}{2} \right) \bmod F + F * s \right) \bmod F, \text{ where } s \text{ is equal to}$$

$[a(m) \text{ XOR } b(m)] \text{ AND } [((a(m) \text{ XOR } a(m-1)) \text{ and } (b(m) \text{ XOR } b(m-1))) \text{ and } a(m) \text{ and } b(m) \text{ and } a(m-1) \text{ and } b(m-1)]$ are the most significant bits of $a(n)$, $b(n)$, $a(n-1)$ and $b(n-1)$ respectively.

- 5 4. A decoder according to any preceding claim, wherein the determination is based upon the sign of $(a(n) \bmod F - b(n) \bmod F - C) \bmod F$ and the sign of $(b(n) \bmod F - a(n) \bmod F - C) \bmod F$.
- 10 5. A decoder according to any preceding claim, wherein the selector is arranged to select and output the modulo of the linear approximation of the MAX* function if the value $|a(n) - b(n)|$ is less than the predetermined threshold value.
- 15 6. A decoder according to any preceding claim, wherein the value of F is to the power of two.
7. A decoder according to any preceding claim, wherein the selector is a multiplexer.
- 20 8. A decoder according to any preceding claim, wherein the calculator is an add module that is arranged to receive $a(n) \bmod F$, $b(n) \bmod F$ and C.
- 25 9. A method for generating a MAX* value, the method comprising receiving a first modulo state metric $a(n) \bmod F$, a second modulo state metric $b(n) \bmod F$ and a predetermined threshold value C for $|a(n) - b(n)|$, where F is a value greater than $|a(n) - b(n)|$ whereby to enable the modulo of a linear approximation of a MAX* function to be calculated using a mod F function of $a(n) \bmod F$, $b(n) \bmod F$ and C; and selecting a value from the group $a(n) \bmod F$, $b(n) \bmod F$, and the calculated modulo based upon a

- 5 determination as to whether the predetermined threshold value C for $|a(n) - b(n)|$ has been met.

10.A method according to claim 9, wherein the modulo of the linear approximation of the MAX* function is calculated using:

$$10 \quad \left(a(n) \bmod F + \frac{((b(n) \bmod F - a(n) \bmod F) \bmod F + C)}{2} \right) \bmod F.$$

11.A method according to claim 9, wherein the modulo of the linear approximation of the MAX* function is calculated using:

$$15 \quad \left(\left(\frac{(a(n) \bmod F + C) \bmod F + b(n) \bmod F}{2} \right) \bmod F + F * s \right) \bmod F, \text{ where } s \text{ is}$$

equal to $[a(m) \text{ XOR } b(m)] \text{ AND } [((a(m) \text{ XOR } a(m-1)) \text{ AND } ((b(m) \text{ XOR } b(m-1))]$.